What is claimed is:

1. A current-in-plane magnetic sensor comprising:

a sensor stack including first and second layers of ferromagnetic material, a first nano-oxide layer positioned adjacent to the first layer of ferromagnetic material, and a layer of non-magnetic material positioned between the first and second layers of ferromagnetic material, wherein the thickness of the non-magnetic layer is selected to provide antiferromagnetic coupling between the first and second ferromagnetic layers;

a magnetic field source for biasing the directions of magnetization of the first and second layers of ferromagnetic material in directions approximately 90° with respect to each other;

a first lead connected to a first end of the sensor stack; and

a second lead connected to a second end of the sensor stack.

2. The magnetic sensor of claim 1, wherein the layer of non-magnetic material has a thickness in the range of 5 to 12 Å.

3. The magnetic sensor of claim 1, wherein the first and second layers of ferromagnetic material each have a thickness in the range of 10 to 20 Å.

4. The magnetic sensor of claim 1, wherein the antiferromagnetic coupling between the first and second ferromagnetic layers comprises:

RKKY coupling, magnetostatic coupling, or a combination of RKKY coupling and magnetostatic coupling.

5. The magnetic sensor of claim 1, wherein the first nano-oxide layer is formed by oxidizing a metallic layer.

6. The magnetic sensor of claim 5, wherein the metallic layer comprises a material selected from Al, Ta, Fe, Co and Ni, and alloys of Al, Ta, Fe, Co and Ni.

7. The magnetic sensor of claim 5, wherein the metallic layer has a thickness in the range of 5 to 15 Å.

8. The magnetic sensor of claim 1, further comprising:

a substrate positioned adjacent to a first side of the sensor stack; and

a cap layer positioned adjacent to the first nano-oxide layer, wherein the first nano-oxide layer is positioned adjacent to a second side of the sensor stack opposite the substrate.

9. The magnetic sensor of claim 8, wherein the cap layer comprises an insulator.

10. The magnetic sensor of claim 8, wherein the cap layer comprises a material selected from the group of: Al oxide, Fe oxide, Co oxide, Ni oxide, Ta, and TaN.

11. The magnetic sensor of claim 1, further comprising:

a second nano-oxide layer positioned adjacent to the second layer of ferromagnetic material.

12. The magnetic sensor of claim 11, wherein the second nano-oxide layer is formed by oxidizing a metallic layer comprising a material selected from Fe, Co and Ni, and alloys of Fe, Co and Ni.

13. The magnetic sensor of claim 12, wherein the metallic layer has a thickness in the range of 5 to 15 Å.

14. The magnetic sensor of claim 11, further comprising:

a seed layer positioned adjacent to the second nano-oxide layer.

15. The magnetic sensor of claim 14, wherein the seed layer comprises NiFeCr.

16. The magnetic sensor of claim 14, wherein the seed layer has a thickness less than 40 Å.

17. The magnetic sensor of claim 1, wherein the first ferromagnetic layer comprises a material selected from the group of CoFe, NiFe, Fe, Co and Ni, and alloys thereof, and the second ferromagnetic layer comprises a material selected from the group of CoFe, NiFe, Fe, Co and Ni, and alloys thereof.

18. The magnetic sensor of claim 1, wherein the magnetic field source comprises:

a permanent magnet positioned adjacent to a side of the sensor stack.

19. The magnetic sensor of claim 18, wherein the side is opposite an air bearing side of the sensor stack.

20. The magnetic sensor of claim 1, further comprising:

a diffusion layer positioned adjacent to the first nano-oxide layer.

21. The magnetic sensor of claim 1, wherein:

AFM magnetostatic coupling between the first and second layers of ferromagnetic material is substantially balanced with the FM RKKY coupling.

22. A disc drive comprising:

a motor for rotating a magnetic storage disc;

an arm for positioning a read head adjacent to the disc; and

wherein the read head includes a sensor stack including first and second layers of ferromagnetic material, a first nano-oxide layer positioned adjacent to the first layer of ferromagnetic material, and a layer of non-magnetic material positioned between the first and second layers of ferromagnetic material, wherein the thickness of the non-magnetic layer is selected to provide antiferromagnetic coupling between the first and second ferromagnetic layers, a magnetic field source for biasing the directions of magnetization of the first and second layers of ferromagnetic material in directions approximately 90° with respect to each other, a first lead connected to a first end of the sensor stack, and a second lead connected to a second end of the sensor stack.

23. The disc drive of claim 22, further comprising:

a cap layer positioned adjacent to the first nano-oxide layer.

24. The disc drive of claim 22, further comprising:

a second nano-oxide layer positioned adjacent to the second layer of ferromagnetic material.

25. The disc drive of claim 22, further comprising:

a diffusion layer positioned adjacent to the first nano-oxide layer.

26. The disc drive of claim 22, wherein:

AFM magnetostatic coupling between the first and second layers of ferromagnetic material is substantially balanced with the FM RKKY coupling.